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| **MS-SMB**  Server Test Suite User Guide | | |
| *Windows is built to be the most interoperable platform* | | |
|  | **MICROSOFT CORPORATION**  ***October 21, 2014***  Send suggestions and comments about this document to dochelp@microsoft.com.  Please include the name of the test suite with your feedback. |  |

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# Introduction

This guideprovides information about how to install, configure, and run MS-SMB Test Suite and its environment. This suite of tools is designed to test implementations of Server Message Block protocol,as specified in the Microsoft document *[MS-SMB]: Server Message Block Protocol Specification.* This guide provides information about using this test suite on the Microsoft® Windows® operating system and on operating systems that are not Windows based.

This suite of tools tests only the protocol implementation behaviors that are observed on the wire. For detailed information about the design of this test suite, see *MS-SMB\_ServerTestDesignSpecification.docx*.

# License Information

For licensing information, see the End User License Agreement (EULA) that was provided with this test suite. The EULA is contained in the EULA.rtf file in the installation folder.

# Further Assistance

If you need further information about this test suite or assistance in troubleshooting issues related to this test suite, contact [dochelp@microsoft.com](mailto:dochelp@microsoft.com).

# Quick Start Checklist

The following checklist summarizes the steps you need to complete to get the test suite up and running. The checklist also provides references to documentation that can help you get started.

Note

For workgroup environment, omit tasks that are related to the setup and configuration of domain controllers.

| **Check** | **Task** | **Topic** |
| --- | --- | --- |
| □ | Download the test suite for the protocol implementation | For a list of the files that the download package contains, see [Installed Files and Folders](#_Installed_Files_and). |
| □ | Confirm that your test environment and computers meet the requirements of the test suite | For information about the requirements of the test suite, see [Requirements](#_Requirements). |
| □ | Install the software prerequisites | For information about software that must be installed on the computers in your test environment before the test suite is installed, see [Software](#_Software). |
| □ | Set up the driver computer | See [Set Up the Driver Computer](#_Set_Up_the_2). |
| □ | Set up the system under test (SUT) | See [Set Up the SUT](#_Set_Up_the). |
| □ | Set up the domain controller (DC) | See [Set Up the DC](#_Test_Client_Computer_1) |
| □ | Set up the network | See [Network Setup](#_Network_Setup_1). |
| □ | Verify the connection from the driver computer to the SUT and other computers | See [Verify Connectivity from the Driver Computer](#_Verify_Connectivity_from_2). |
| □ | Configure the SUT | See [Configure the SUT](#_Configure_the_SUT_1) or [Configure a SUT that is Not Windows-based](#_Configure_a_SUT_1). |
| □ | Configure the driver computer | See [Configure the Driver Computer](#_Configuring_Computers_that). |
| □ | Configure the test suite settings | See [Configuring the Test Suite](#_Guidelines_for_Configuring_2). |

# Requirements

This section describes the requirements for the test environment that are used to run this test suite.

Note

The requirements in this section apply only to the Windows-based computers in the test environment. Note that the driver computer must use a Windows-based operating system.

Note

Workgroup environment do not require a domain controller.

## Network Infrastructure

* A test network is required to connect the test computer systems.
* It must consist of an isolated hub or switch.
* It must not be connected to a production network or used for any other business or personal communications or operations.
* It must not be connected to the internet.
* IP addresses must be assigned for a test network.
* Computer names should be assigned in a test network infrastructure.
* User credentials used on the system must be dedicated to the test network infrastructure.
* Details including computer IP addresses, names and credentials are saved in log files.

Refer to the Privacy Statement and EULA for further information.

## Environment

Run this test suite in a workgroup environment that contains the following computers, physical or virtual:

* A driver computer running Microsoft® Windows® 8.1, 32-bit edition, with the latest updates
* A computer set up as a Windows-based SUT running Windows Server® 2012 R2, or a computer set up as a SUT that is not based on the Windows operating system

Run this test suite in a domain environment that contains the following computers, physical or virtual:

* A driver computer running Microsoft® Windows® 8.1, 32-bit edition, with the latest updates
* A computer set up as a Windows-based SUT running Windows Server® 2012 R2, or a computer set up as a SUT that is not based on the Windows operating system
* A computer set up as a domain controller (DC) running Windows Server® 2012 R2, or a computer set up as DC that is not based on the Windows operating system service

## Driver Computer

The minimum requirements for the driver computer are as follows.

| **Requirement** | **Description** |
| --- | --- |
| Operating system | Microsoft Windows 8.1, 32-bit edition, with the latest updates |
| Memory | 2 GB RAM |
| Disk space | 60 GB |

## System Under Test (SUT)

The minimum requirements for the SUT are as follows.

| **Requirement** | **Description** |
| --- | --- |
| Operating system | Microsoft Windows Server 2012 R2, Enterprise Edition, or a SUT implementation that is not based on the Windows operating system |
| Memory | 1 GB RAM |
| Disk space | 60 GB |

## Domain Controller (DC)

The minimum requirements for the DC are as follows.

| **Requirement** | **Description** |
| --- | --- |
| Operating system | Microsoft Windows Server 2012 R2, Enterprise Edition, or a DC implementation that is not based on the Windows operating system |
| Services | Active Directory Domain Services (AD DS) |
| Memory | 1 GB RAM |
| Disk space | 60 GB |

## Software

All of the following software must be installed on the driver computer *before* the installation of this test suite.

|  |
| --- |
| **Required Software** |
| * Microsoft® Visual Studio® 2012   You can download Visual Studio Ultimate 2012 Trial (30 days) from below website  <http://www.microsoft.com/en-us/download/details.aspx?id=30678>  You can download Visual Studio 2012 Update 4 or later from below website  <http://www.microsoft.com/en-us/download/confirmation.aspx?id=39305>   * Spec Explorer (build 3.5.3146.0 or later)   You can download Spec Explorer from below website  <http://visualstudiogallery.msdn.microsoft.com/271d0904-f178-4ce9-956b-d9bfa4902745/>   * Microsoft Protocol Test Framework 1.0.2220.0   You can download Protocol Test Framework from below website  <https://connect.microsoft.com/site216/Downloads/DownloadDetails.aspx?DownloadID=52728>   * Windows PowerShell 3.0. |
| **Optional Software** |
| * Microsoft Message Analyzer   You can download the latest Message Analyzer from below website.  <http://connect.microsoft.com/site216>  To be able to see the latest download, you must log on to the site and join Message Analyzer project.   * Sign in by your Microsoft account at the top right corner. * Back to Home page and search **Message Analyzer**. * Join **Message Analyzer and Network Monitor** from the search result. |

# Network Setup

Run this test suite in a workgroup or domain environment using either physical or virtual machines. This section describes the test environment using physical computers.

For information about configuring a virtual machine, see <http://www.microsoft.com/virtualization/en/us/solution-appliance-test.aspx>. The configuration of virtual machines for use with this test suite is out of the scope of this guide.

## Workgroup Environment

The workgroup environment requires interactions between the following computers.

* The driver computer runs the test cases by sending requests over the wire in the form of protocol messages.
* The SUT runs an implementation of the protocol that is being tested. The SUT responds to the requests that the driver computer sends.

The following figure shows the workgroup environment.



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Machine Name | IPv4 | Subnet Mask | Default Gateway | DNS Server |
| Driver | 192.168.1.111 | 255.255.255.0 | <empty> | <empty> |
| SUT | 192.168.1.11 | 255.255.255.0 | <empty> | <empty> |

## Domain Environment

The domain environment requires interactions between the following computers and server roles.

* The driver computer runs the test cases by sending requests over the wire in the form of protocol messages.
* The SUT runs an implementation of the protocol that is being tested. The SUT responds to the requests that the driver computer sends.
* The DC provides functionality that is required to test the protocol implementation. Specifically, the DC hosts Active Directory Domain Services (AD DS) and supports the protocol implementation.

The following figure shows the domain environment.



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Machine Name | IPv4 | Subnet Mask | Default Gateway | DNS Server |
| DC | 192.168.1.1 | 255.255.255.0 | <empty> | 127.0.0.1 |
| Driver | 192.168.1.111 | 255.255.255.0 | 192.168.1.1 | 192.168.1.1 |
| SUT | 192.168.1.11 | 255.255.255.0 | 192.168.1.1 | 192.168.1.1 |

## Verify Connectivity from the Driver Computer

After you install the environment, verify the connection from the driver computer to the SUT, and between all other computers in the test environment. The following provides a general list of steps you can use to check for connectivity between two Windows-based computers. For further information, see the administration guide for your operating system.

To check the connection from the driver computer

1. Disable active firewalls in the test environment.
2. Click the **Start** button, and then click **Run**.
3. In the **Run** dialog box, type **cmd** and then click **OK**.
4. At the command prompt, type **ping** followed by the hostname or IP address of the SUT, and then press **Enter**. The following example checks the connection to a SUT named "SUT01":

> ping SUT01

1. Repeat these steps until you confirm connectivity between all computers in the test environment.

Do not proceed with the configuration of the test suite until connectivity is confirmed. Any issues with network connectivity must be resolved before you configure the test suite.

# Computer Setup

This section explains how to set up the computers for the test environment.

Note

For workgroup environment, omit tasks that are related to the setup and configuration of domain controllers.

## Set Up the Domain Controller

This section provides information about how to set up a DC for use with this test suite.

cid:image001.png@01CC1C91.79DF1340**Note**

Please ignore this step if testing under workgroup environment

**To set up a Windows-based DC**

1. Install Active Directory Domain Services manually
2. Promote to Domain Controller: Domain name is contoso.com and Administrator’s password is “Password01!”

To set up a DC that is not based on the Windows operating system, see [Configure a DC that is Not Windows-based](#_Configure_a_KDC).

## Set Up the Driver Computer

This section describes how to set up the driver computer.

Important

Microsoft Visual Studio 2012, Protocol Test Framework, and Spec Explorer must be installed on the driver computer before you run the test suite installer.

To set up the driver computer

1. Join the computer to domain (ignore this step if it’s a workgroup environment).
2. Copy the test suite package to the driver computer.
3. Extract all the files from the package, but do not install them.
4. Install the required and optional software described earlier.
5. Run the MS-SMB-TestSuite-ServerEP.msi installer on the driver computer.
6. When options are prompted, select the option, **Install Test Suite on Driver Computer**.

## Set Up the SUT

This section provides information about how to set up a SUT for use with this test suite.

To set up a Windows-based SUT

1. Join the computer to domain (ignore this step if it’s a workgroup environment).
2. Copy MS-SMB-TestSuite-ServerEP.msi installer on the Windows-based SUT.
3. Copy **Protocol Test Suites Privacy Statement.rtf** on the Windows-based SUT.
4. Run the MS-SMB-TestSuite-ServerEP.msi installer on the Windows-based SUT.
5. When options are prompted, select the option, **Install and configure Windows System Under Test (SUT)**.

To set up a SUT that is not based on the Windows operating system, see [Configure a SUT that is Not Windows-based](#_Configure_a_SUT_1).

## Installed Files and Folders

The installation process adds the following folders and files to the driver computer at C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\*<version#>*\.

Note

This path may vary based on your installation location.

The *<version#>* placeholder indicates the installed build of the test suite.

| **File or Folder** | **Description** |
| --- | --- |
| Batch | Command files you can use to run individual test cases or all test cases. |
| Bin | Test suite binaries and configuration files. |
| Docs | **[MS-SMB].pdf** – The version of the technical document that this test suite is based on.  **MS-SMB\_ServerAdapter.chm** – A .chm file containing reference information, including classes, methods, and data types, for this test suite.  **MS-SMB\_ServerUserGuide.docx** – A user guide that explains how to install and configure the driver computer, the SUT and the DC, as well as how to run test cases.  **MS-SMB\_ServerReleaseNotes.docx** – Release notes that provide information including late-breaking changes and known issues for this test suite.  **MS-SMB\_ServerRequirementSpec.xlsm** – A specification listing all the requirements that were discovered in technical review of the protocol specification. This document provides detailed information about the validation of these requirements, including their derivation, scenarios and validation, and validation comments.  **MS-SMB\_ServerTestDesignSpecification.docx** – An overview document containing conceptual information about a protocol including probable use, relationships to other protocols, message flow, state diagrams, a short list of properties, and a test approach describing justification and adapter approach.  Note  The driver computer should include Microsoft Office or other programs that can open and display these documents. If it does not, you can copy these documents to a computer equipped with applications that can. |
| Scripts | Scripts that are used to set up and configure the driver computer and the Windows-based SUT, and the Windows-based DC. |
| Source | Test suite source code. |
| EULA.rtf | The End User License Agreement. |

The installation process adds the following files and folders to the Windows-based SUT at C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\*<version#>*\.

| **File or Folder** | **Description** |
| --- | --- |
| Scripts | Scripts that are used to set up and configure the driver computer and the Windows-based SUT, and the Windows-based DC. |
| EULA.rtf | The End User License Agreement. |

# Configuration

This section explains how to configure the test environment.

Note

For workgroup environment, omit tasks that are related to the setup and configuration of domain controllers.

## Configuring Windows-based Computers

This section explains how to configure computers for a Windows-based test environment.

For general information about configuring computers that are not based on Windows, see [Configuring Computers that are Not Based on Windows](#_Configuring_Computers_that_1).

Note

For domain environment, add the driver computer and SUT to the existing domain that is created on the DC before starting to configure Windows-based Computers.

### Configure the Driver Computer

This section provides a general list of steps that you can use to configure the driver computer in a Windows-based test environment. For specific information about how to complete these steps, see the administration guide for your operating system.

To configure the driver computer

1. Log on to the driver computer as domain administrator for domain environment; log on as local administrator for workgroup environment.
2. Go to C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\*<version#>*\Scripts, and open the ParamConfig.xml file.
3. Edit the properties as shown in the following table.

| **Property** | **Description** |
| --- | --- |
| **domainInVM** | The domain Name, the value will be ignored in Workgroup test environment  The default value is “contoso.com” |
| **IPVersion** | The IP version used in the protocol  The default value is “IPv4” |
| **logFile** | The file path for storing the logs during configuration  The default value is “..\TestResults\Config-Server.ps1.log” |
| **logPath** | The path to store log file.  The default value is “..\TestResults” |
| **serverComputerName** | The computer name of SUT  The default value is “SUT01” |
| **sutOS** | The OS version of SUT  The default value is “Win8Server” |
| **userNameInVM** | The local administrator account that is used to log on to the VMs.  The default value is "administrator". |
| **userPwdInVM** | The password that is used to log on to the local administrator account.  The default value is "Password01!" |
| **workgroupDomain** | The test environment. If it is in domain environment, set the value to “Domain”; if it is in workgroup environment, set the value to “Workgroup”.  The default value is "Domain". |

1. Start Windows® PowerShell™ by right-clicking on the **Windows PowerShell** icon, and then click **Run as Administrator** or, from a Windows PowerShell command window, type:

Start-process powershell -verb runAs

1. At the command prompt, type Set-ExecutionPolicy Unrestricted -F, and press **Enter**.
2. Type cd C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\*<version#>*\Scripts, and press **Enter**.
3. Type .\Config-Client.ps1, and press **Enter**.

### Configure the SUT

This section provides a general list of steps that you can use to configure the SUT in a Windows-based test environment. For specific information about how to complete these steps, see the administration guide for your operating system.

To configure the SUT

1. Log on to the SUT as domain administrator for domain environment; log on as local administrator for workgroup environment.
2. Go to C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\*<version#>*\Scripts, and open the ParamConfig.xml file.
3. Edit the properties as shown in the following table.

| **Property** | **Description** |
| --- | --- |
| **domainInVM** | The domain Name, the value will be ignored in Workgroup test environment  The default value is “contoso.com” |
| **IPVersion** | The IP version used in the protocol  The default value is “IPv4” |
| **logFile** | The file path for storing the logs during configuration  The default value is ..\TestResults\Config-Server.ps1.log” |
| **logPath** | The path to store log file.  The default value is “..\TestResults” |
| **serverComputerName** | The computer name of SUT  The default value is “SUT01” |
| **sutOS** | The OS version of SUT, for Non-windows implementation, set it to “NonWindows”  The default value is “Win8Server” |
| **userNameInVM** | The local administrator account that is used to log on to the VMs.  The default value is "administrator". |
| **userPwdInVM** | The password that is used to log on to the local administrator account.  The default value is "Password01!" |
| **workgroupDomain** | The test environment. If it is in domain environment, set the value to “Domain”; if it is in workgroup environment, set the value to “Workgroup”.  The default value is "Domain". |

1. Start Windows PowerShell by right-clicking on the **Windows PowerShell** icon, and then click **Run as Administrator** or, from a Windows PowerShell command window, type:

Start-process powershell -verb runAs

1. At the command prompt, type Set-ExecutionPolicy Unrestricted -F, and press **Enter**.
2. Type cd C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\*<version#>*\Scripts, and press **Enter**.
3. Type .\Config-Server.ps1 and press **Enter**.

### Configure the DC

For domain environment, we need to enable **Guest** account in DC.

1. Open “Server Manager” > Tools > Active Directory Users and Computers.
2. Open tree to Active Directory Users and Computers > Contoso.com > Users
3. Right-click on “Guest” account, select “All Tasks” > Enable Account.
4. After enable, right-click on the account, select “All Tasks” > Reset Password.
5. In the “Reset Password” dialog, set the password to the one we use for test, by default, it is “Password01!”

## Configuring Computers that are Not Based on Windows

This guide provides only basic information about configuring the test environment for computers that are not running Windows-based operating systems.

* For domain environment, join all computers to the domain of the domain controller.
* Disable active firewalls on all computers.

### Configure a DC that is Not Windows-based

This section provides general instructions for the configuration of a DC that runs an operating system other than the Windows operating system.

* Install directory service on DC (This is not required if testing under workgroup environment)
* Promote it to domain controller
* Enable “**Guest**” account and set password to “Password01!”

### Configure a SUT that is Not Windows-based

This section provides basic information about the configuration of an SUT that runs an operating system other than the Windows operating system.

For information about how to configure a Windows-based SUT, see [Configure the SUT](#_Configure_the_SUT_1). For detailed instructions about how to complete the tasks that this process requires, see the administration guide for your operating system.

To configure the SUT

* Disable active firewalls.
* Turn on file and printer sharing.
* Enable the local guest account and set password to “Password01!”
* Install DFS management, create a standalone namespace “DFSNamespace”.
* Create a NTFS disk.
* Create a FAT disk (Default disk is NTFS disk, if the Server OS already has a FAT disk, please skip this step).
* Create directories and files on the NTFS disk to be shared and used by the MS-SMB test suite:
  + - * Create two folders named “Sharefolder1” and “Sharefolder2” under the shared root directory which was created as a NTFS disk
      * Set folders “Sharefolder1” and “Sharefolder2” share property to “Everyone” and grant “Read/Write” permission
      * Create a .txt file named “ExistTest.txt” with any content at the root of “Sharefolder1” and “Sharefolder2”
      * Create one folder named “QuotaShare” under the shared root directory which was created as a NTFS disk
      * Set folder “QuotaShare” share property to local and domain (ignore this if it’s a workgroup environment) “Guest” user and grant “Full Control” permission
* Create directories and files on the FAT disk to be shared and used by the MS-SMB test suite:
  + - * Create two folders named “Sharefolder3” and “Sharefolder4” under the shared root directory which was created as a FAT disk.
      * Set folders “Sharefolder3” and “Sharefolder4” share property to “Everyone” and grant “Read/Write” permission
* Create a shadow copy for the NTFS disk and then change content of “ExistTest.txt” under the folders “Sharefolder1” and “Sharefolder2”. Make sure “ExistTest.txt” has a previous version.

## Create a physically nonexistent printer and select the printer’s model as “Brother Color Type3 Class Driver”, share this printer with share name “SMBPrinter”.Configuring the Test Suite

This test suite is installed with default configuration settings. You may need to change these settings if you use a customized test environment or if you customize your test runs.

You can configure the test suite for various purposes including, for example, to:

* Define the settings of the test environment, including computer names and IP addresses.
* Define the basic options used in the test suite, for example, the protocol version or the version of the target operating system.
* Define the folders and formats used for output from test runs.
* Define scripts to run before and after each test run.
* Set time limits on discrete test tasks and for test runs.

To change configuration settings, edit the MS-SMB\_ServerTestSuite.deployment.ptfconfig file. You can find this file in the directory C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\*<version#>*\Bin.

# Running Test Cases

This test suite includes command files that you can use to complete some basic test cases. Each test case verifies the protocol implementation based on a given scenario.

You can find and run these test cases in the following directory:

C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\*<version#>*\Batch

You can run these command files at the command prompt, or by selecting and clicking one or more of the files from the directory.

For test environments that are not Windows based

Before you run test cases, be sure to complete the following tasks:

* Implement all the features that are listed in C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\*<version#>*\Bin\NonWindows\
* Copy and replace all files from C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\*<version#>*\Bin\NonWindows\to C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\*<version#>*\Bin\

## Run All Test Cases

Use the steps below to run all test cases.

* From the desktop of the driver computer, double-click the **Run MS-SMB Server-EP Test Cases** shortcut. This shortcut is created during the installation process.

Alternatively, go to C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\*<version#>*\Batch, and double-click the **RunAllTestCases.cmd** file.

## Run Test Cases by Category

Use the steps below to run test cases by category.

* From the directory C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\*<version#>*\Batch, double-click the **RunTestCasesByCategory.cmd** file.

## Check Test Results

Test suite generates test result files in different paths based on the way how test case is executed.

For running test case with batch: C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\*<version#>*\Batch\TestResults

For running test case with Visual Studio: C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\<version#>\Source\Server\TestCode\TestResults

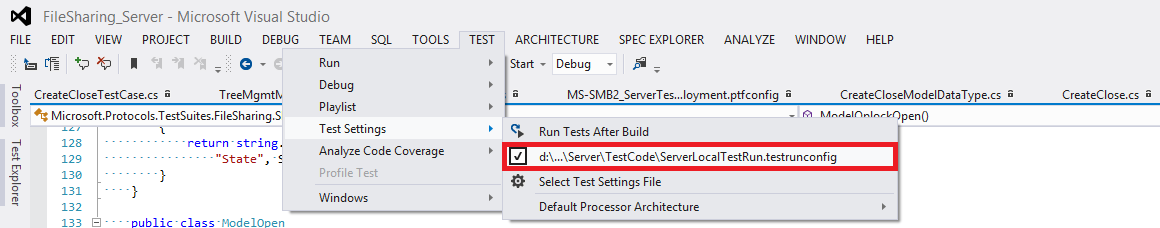
For further information about logging in the Protocol Test Framework (PTF), see the PTF User Guide in the PTF installation directory

# Debugging Test Cases

You can use the Visual Studio solution (.sln) file included with this test suite to debug additional test cases that you create for your protocol implementation.

Note

* Copy MS-SMB\_ServerTestSuite.deployment.ptfconfig from C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\<version#>\Bin to C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\<version#>\Source\Server\TestCode\TestSuite and replace the original file
* While using Microsoft® Visual Studio® 2012 or above to run test cases, test suite may throw exception with message of “Cannot get test site”. To solve this issue, please select the test settings file under test settings menu.



To debug a test case

1. On the driver computer, use Microsoft® Visual Studio® 2012 or above to open the following solution file:

C:\MicrosoftProtocolTests\MS-SMB\Server-Endpoint\*<version#>*\Source\Server\TestCode\MS-SMB\_Server.sln

1. In Visual Studio, in the Solution Explorer window, right-click the **Solution ‘MS-SMB\_Server’,** and select **Build Solution**.
2. When you build the test project, the tests appear in **Test Explorer**. If Test Explorer is not visible, choose Test on the Visual Studio menu, choose Windows, and then choose Test Explorer.
3. Select your test cases from **Test Explorer** and run or debug them.